

AMENDMENTS TO THE CLAIMS

1-28. (Cancelled)

29. (Currently Amended) A deformable mirror comprising:

a reflection mirror having a reflection surface on which light is reflected, at least part of the reflection mirror being made of a ferromagnetic member, the reflection mirror having a deformed state and a non-deformed state; and

a switching device that switches the reflection mirror between the deformed state and the non-deformed state using a magnetic force, the switching device having a hard magnetic member made of a hard magnetic material and a magnetizing unit including a magnetizing coil,

wherein a voltage is applied to~~current is passed through~~ the switching device by a driving circuit,

~~wherein the hard magnetic member has a state in which the hard magnetic member is magnetized and a state in which the hard magnetic member is demagnetized, and~~

wherein the magnetizing unit is (i) capable of applying voltage to the magnetizing coil so that the hard magnetic member enters switchable between the a state in which the hard magnetic member is magnetized and (ii) capable of applying voltage to the magnetizing coil so that the hard magnetic member, when in the state in which the hard magnetic member is magnetized, enters a[[the]] state in which the hard magnetic member is demagnetized, and

wherein the voltage is~~current, applied by the driving circuit to,~~is passed through the magnetizing coil of the switching device only when the reflection mirror is switched between the deformed state and the non-deformed state.

30. (Previously Presented) The deformable mirror according to Claim 29, wherein:

the reflection mirror is switched into the deformed state by attracting the ferromagnetic member in the reflection mirror when the hard magnetic member is magnetized by the magnetizing unit, and the reflection mirror is switched into the non-deformed state when the hard magnetic member is demagnetized by the magnetizing unit.

31. (Previously Presented) The deformable mirror according to Claim 29, wherein:

the magnetizing unit includes a yoke and a sub-coil.

32. (Previously Presented) The deformable mirror according to Claim 31, wherein:
the reflection mirror includes a back surface and a side portion; and
at least part of the sub-coil and the yoke are disposed on the back surface and the side portion of the reflection mirror.

33 - 37. (Cancelled)

38. (Previously Presented) The deformable mirror according to Claim 29, wherein:
the reflection mirror includes a base member comprising a glass plate; and
the ferromagnetic member is provided to at least part of the base member.

39. (Previously Presented) The deformable mirror according to Claim 29, wherein:
the reflection mirror includes a base member comprising a ferromagnetic plate material.

40. (Previously Presented) The deformable mirror according to Claim 31, wherein:
the ferromagnetic member and the yoke form part of a magnetic circuit.

41. (Previously Presented) The deformable mirror according to Claim 38, wherein:
the reflection surface comprises a reflection coating provided on a surface of the base member.

42. (Previously Presented) The deformable mirror according to Claim 41, wherein:
the reflection coating comprises a dielectric multi-layer film.

43. (Previously Presented) The deformable mirror according to Claim 41, wherein:
the reflection coating is provided on each of the surfaces of the base member.

44. (Previously Presented) The deformable mirror according to Claim 41, wherein:
the reflection coating is provided on one surface of the base member; and

a counter coating is formed on another surface of the base member, the counter coating having a coefficient of thermal expansion that is the same as a coefficient of thermal expansion of the reflection coating.

45. (Previously Presented) The deformable mirror according to Claim 29, wherein:

the ferromagnetic member is made of a hard magnetic material.

46. (Previously Presented) The deformable mirror according to Claim 29, further comprising:

a base; and

a holding member supported on the base,

wherein the reflection mirror is held elastically by the holding member, and the switching device is incorporated into the base.

47. (Previously Presented) The deformable mirror according to Claim 46, wherein:

the base is provided with a recessed portion that is recessed in a deforming direction of the reflection mirror; and

the reflection mirror is configured to be held such that the recessed portion of the base is covered, and, when the reflection mirror is in the deformed state, the reflection mirror is maintained in the deformed state by abutting on the recessed portion.

48. (Previously Presented) The deformable mirror according to Claim 47, wherein:

the reflection mirror is almost elliptical in shape; and

the recessed portion of the base is almost elliptical in shape corresponding to the almost elliptical shape of the reflection mirror.

49. (Previously Presented) The deformable mirror according to Claim 46, wherein:

the holding member presses the reflection mirror toward the base with a spring force.

50. (Previously Presented) The deformable mirror according to Claim 49, wherein:

the holding member includes a base portion incorporated into the base, a blade spring portion extending from the base portion, and a presser frame portion connected to the blade spring portion and pressing down on the reflection mirror.

51. (Previously Presented) The deformable mirror according to Claim 46, wherein:

the holding member is made of an elastic adhesive.

52. (Currently Amended) An optical head configured to concentrate light on an optical information recording medium, the optical head comprising:

an objective lens that concentrates light on the optical information recording medium;
an objective lens actuator that drives the objective lens; and
a deformable mirror disposed to reflect light emitted from a light source toward the objective lens,

the deformable mirror including:

a reflection mirror having a reflection surface on which light is reflected, at least part of the reflection mirror being made of a ferromagnetic member, the reflection mirror having a deformed state and a non-deformed state; and

a switching device that switches the reflection mirror between the deformed state and the non-deformed state using a magnetic force, the switching device having a hard magnetic member made of a hard magnetic material and a magnetizing unit including a magnetizing coil,

wherein a voltage is applied to~~current is passed through~~ the switching device by a driving circuit,

~~wherein the hard magnetic member has a state in which the hard magnetic member is magnetized and a state in which the hard magnetic member is demagnetized, and~~

wherein the magnetizing unit is (i) capable of applying voltage to the magnetizing coil so that the hard magnetic member enters~~switchable between the~~a state in which the hard magnetic member is magnetized and (ii) capable of applying voltage to the magnetizing coil so that the hard magnetic member, when in the state in which the hard magnetic member is magnetized, enters a[[the]] state in which the hard magnetic member is demagnetized, and

wherein the voltage is applied~~current, applied~~ by the driving circuit to, is passed through the magnetizing coil of the switching device only when the reflection mirror is switched between the deformed state and the non-deformed state.

53. (Previously Presented) The optical head according to Claim 52, wherein:

the deformable mirror is provided in a space below the objective lens actuator.

54. (Currently Amended) An optical recording and playback device that concentrates light on an optical recording and playback medium having two recording layers and performs at least one of recording information in and reading recorded information from the optical recording and playback medium, the optical recording and playback device comprising:

an optical head; and

a feeding portion that supplies the optical head with power,

the optical head configured to concentrate light on an optical recording and playback medium, the optical head including:

an objective lens that concentrates light on the optical recording and playback medium;

an objective lens actuator that drives the objective lens; and

a deformable mirror disposed to reflect light emitted from a light source toward the objective lens,

the deformable mirror including:

a reflection mirror having a reflection surface on which light is reflected, at least part of the reflection mirror being made of a ferromagnetic member, the reflection mirror having a deformed state and a non-deformed state; and

a switching device that switches the reflection mirror between the deformed state and the non-deformed state using a magnetic force, the switching device having a hard magnetic member made of a hard magnetic material and a magnetizing unit including a magnetizing coil,

~~wherein the hard magnetic member has a state in which the hard magnetic member is magnetized and a state in which the hard magnetic member is demagnetized, and~~

wherein the magnetizing unit is (i) capable of applying voltage to the magnetizing coil so that the hard magnetic member enters switchable between the a state in which the hard magnetic

member is magnetized and (ii) capable of applying voltage to the magnetizing coil so that the hard magnetic member, when in the state in which the hard magnetic member is magnetized, enters a[[the]] state in which the hard magnetic member is demagnetized, and

wherein the feeding portion supplies the optical head with the power needed to switch the states of the reflection mirror only when the reflection mirror is switched between the deformed state and the non-deformed state.

55. (Previously Presented) The optical recording and playback device according to Claim 54, wherein:

the deformable mirror uses the reflection mirror as a plane mirror when light is concentrated on a first recording layer farther from a light-incident surface of the optical recording and playback medium, and deforms the reflection mirror to be a concave mirror with the reflection surface forming a concave surface when light is concentrated on a second recording layer closer to the light-incident surface of the optical recording and playback medium.

56. (Previously Presented) The optical recording and playback device according to Claim 54, wherein:

the feeding portion applies a pulse of voltage only when the states of the reflection mirror are switched.